APPENDIX D.
Entry and Advancement in the Georgia Construction and Engineering-related Industries

Appendix D examines entry and advancement in the Georgia construction and engineering-related industries. Appendix E explores business formation; Appendix F considers the success of businesses. Related to both of these topics, an examination of access to capital can be found in Appendix G. Together, these appendices present an overview of marketplace conditions in the Georgia construction and engineering-related industries, referred to as "study industries" in this report. Appendix H discusses data sources used in these appendices.

In Appendix D and other marketplace appendices, engineering-related work refers to architectural, engineering and related services.[1] Each reference to the "engineering industry" refers to these types of services.

Introduction

BBC examined whether there were barriers to formation of minority- and women-owned businesses in Georgia. Business ownership often results from ascending the ranks within a particular industry. Within this process of entry and advancement in the Georgia construction and engineering-related industries, there may be some barriers that limit opportunities for minorities and women. This appendix uses 1980 and 2000 Census data and 2007-2009 American Community Survey (ACS) data to analyze education, employment and workplace advancement — all factors that influence the likelihood of forming a business. Where possible, BBC used these data to examine the construction and engineering-related industries separately, as entrance requirements and opportunities for advancement often differ across industries. BBC used historical data, such as 1980 Census data, in order to assess changes over time.

Representation of minorities among workers and business owners in Georgia. As a starting point, the study team examined how business owners in Georgia and the United States differed from the entire labor force with respect to the representation of racial and ethnic minorities. Based on 2000 and 2007-2009 data, Figure D-1 on the following page shows the demographics of the overall labor force in Georgia and the United States, business owners in Georgia and the U. S., and business owners in the study industries. Results for Georgia in 2007-2009 show the following:

- African Americans represented about 29 percent of workers, 17 percent of all business owners, but less than 12 percent of business owners in study industries;
- About 8 percent of workers, about 7 percent of all business owners and 12 percent of business owners in study industries were Hispanic Americans;

[1] "Architectural, engineering and related services" was coded under the 1980 and 2000 Census industrial classification system as 882 and 729, respectively. In the 2007-2009 ACS, it was coded as 7290.

- Asian-Pacific Americans were about 2 percent of all workers and 3 percent of business owners, but a smaller proportion of business owners in study industries (1%);

- Subcontinent Asian Americans and other minority groups represented less than 1 percent of workers and business owners in the study industries in Georgia;

- Native Americans comprised less than 1 percent of all workers, all business owners and business owners in study industries; and

- Non-Hispanic whites made up about 60 percent of the Georgia workforce and 71 percent of Georgia business owners. In study industries, non-Hispanic whites comprised an even larger share of business owners (74%).

Representation of women among workers and business owners in Georgia. Figure D-1 also presents the proportion of workers and business owners that were women in Georgia and in the United States overall. In 2007-2009, women made up about 47 percent of the Georgia labor force and 34 percent of business owners. However, only 7 percent of business owners in the study industries were women during these years.

In the United States, women also comprised a very small percentage of business owners in study industries (7%), especially compared to their representation in the entire workforce (47%).

Figure D-1.
Demographic distribution of the workforce and business owners, 2000 and 2007-2009

Georgia	Workforce in all industries 2000 (n=200,033)	Workforce in all industries 2007-09 (n=141,189)	Business owners in all industries 2000 (n=18,345)	Business owners in all industries 2007-09 (n=14,543)	Business owners in study industries 2000 (n=4,224)	Business owners in study industries 2007-09 (n=3,032)
Race/ethnicity						
African American	25.9 %	29.2 %	13.7 % **	16.7 % **	11.4 % **	11.5 % **
Asian-Pacific American	1.7	2.2	1.8	3.4 **	0.5 **	1.0 **
Subcontinent Asian American	0.7	1.0	0.8	1.5 **	0.2	0.1 **
Hispanic American	5.3	7.5	3.4 **	6.6 **	5.0	11.8 **
Native American	0.6	0.5	0.7	0.5	1.2	0.6
Other minority group	0.2	0.3	0.4	0.3	0.3	0.5
Total minority	34.4 %	40.7 %	20.8 %	28.9 %	18.5 %	25.5 %
Non-Hispanic white	65.6	59.3	79.2 **	71.1 **	81.5 **	74.4 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
Gender						
Female	46.2 %	47.1 %	31.9 % **	33.7 % **	7.9 % **	7.3 % **
Male	53.8	52.9	68.1 **	66.3 **	92.1 **	92.7 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

United States	Workforce in all industries 2000 (n=6,832,970)	Workforce in all industries 2007-09 (n=1,513,063)	Business owners in all industries 2000 (n=676,804)	Business owners in all industries 2007-09 (n=159,643)	Business owners in study industries 2000 (n=119,227)	Business owners in study industries 2007-09 (n=29,627)
Race/ethnicity						
African American	10.9 %	11.7 %	4.9 % **	5.7 % **	4.0 % **	4.3 % **
Asian-Pacific American	3.4	4.1	3.4	4.2 **	1.3 **	1.7 **
Subcontinent Asian American	0.7	1.0	0.7	1.0	0.2 **	0.2 **
Hispanic American	10.7	14.3	7.3 **	12.0 **	7.7 **	14.9 **
Native American	1.1	1.0	1.0 **	0.9 **	1.2	1.1
Other minority group	0.4	0.2	0.5	0.2	0.5	0.2
Total minority	27.3 %	32.3 %	17.7 %	24.0 %	14.9 %	22.4 %
Non-Hispanic white	72.7	67.7	82.3 **	76.1 **	85.1 **	77.6 **
Total	100.0 %	100.0 %	100.0 %	100.1 %	100.0 %	100.0 %
Gender						
Female	46.5 %	46.7 %	33.6 % **	34.2 % **	7.9 % **	7.4 % **
Male	53.5	53.3	66.4 **	65.8 **	92.1 **	92.6 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

Note: ** Denotes that the difference in proportions between all workers and business owners (or business owners in study industries) for the given race/ethnicity/gender group is statistically significant at the 95% confidence level.

Source: BBC Research & Consulting from 2000 U.S. Census 5% sample and 2007-2009 ACS Public Use Microdata Sample. The raw data extracts were obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Construction Industry

BBC first examined the construction industry and how education, training, employment and advancement may affect the number of businesses owned by different race/ethnicity and gender groups in Georgia.

Education. Formal education beyond high school is not a prerequisite for most construction jobs. For this reason, the construction industry often attracts individuals who have less formal education.

- Based on the 2007-2009 ACS data, 39 percent of workers in construction were high school graduates with no post-secondary education, and 30 percent had not finished high school.

- Only about 10 percent of those in the construction industry had a four-year college degree or higher, compared to 29 percent of all workers.

Based upon 2007-2009 data, Hispanic Americans, African Americans and Native Americans in Georgia are less likely to have education beyond high school than non-Hispanic whites. Based on minimal formal educational requirements for entry-level jobs, one might expect high representation of Hispanic Americans, African Americans and Native Americans in the Georgia construction industry.

On the other hand, Asian-Pacific Americans and Subcontinent Asian Americans in Georgia have more formal education, on average, than non-Hispanic whites. Among workers age 25 or older in Georgia, 45 percent of Asian-Pacific Americans and 76 percent of Subcontinent Asian Americans had at least a four-year college degree in 2007-2009. By comparison, about 37 percent of non-Hispanic whites, 15 percent of Hispanic Americans and 24 percent of African Americans had a bachelor's degree or higher. Given this relatively high educational attainment, Asian-Pacific Americans and Subcontinent Asian Americans might be expected to have lower representation in construction relative to other minority groups.

In Georgia, female workers were as likely as men to have an education beyond high school. Among workers 25 years or older in 2007-2009, 31 percent of men and 33 percent of women (an increase from 2000) had at least a bachelor's degree.

Training in the construction industry is largely on-the-job or through trade schools and apprenticeship programs. Entry-level jobs for workers out of high school include laborers, helpers or apprentices. Higher-skilled positions in the construction industry may require additional training through a technical or trade school or through an apprenticeship or other employer-provided training program. Such apprenticeship programs can be developed by employers, trade associations, trade unions and other groups. Workers often enter these programs from high school or a trade school. Apprenticeships have traditionally been three- to five-year programs that combine on-the-job training with classroom instruction.[2] Opportunities for these programs across race/ethnicity are discussed later in this appendix.

Employment. With educational attainment among minorities and women as a context, the study team examined employment in the Georgia construction industry. Based on data from 1980, 2000 and 2007-2009, Figure D-2 compares the demographic composition of workers in the construction industry with that of the entire labor force in Georgia and in the United States.

Of the people working in the Georgia construction industry in 2007-2009:

- 25 percent were Hispanic Americans;
- About 15 percent were African Americans;
- Less than 1 percent were Asian-Pacific Americans;
- Less than 1 percent were Subcontinent Asian Americans; and
- Less than 1 percent were Native Americans.

[2] Bureau of Labor Statistics, U.S. Department of Labor. 2010-11. "Construction." C*areer Guide to Industries.* http://www.bls.gov/oco/cg/cgs003.htm (accessed May 24, 2010).

In 2007-2009, Hispanic Americans made up a greater share of workers in construction than in the overall Georgia workforce. About 25 percent of construction workers were Hispanic Americans, compared to 8 percent of workers in all industries. As discussed above, Hispanic Americans had less education, on average, than all workers Georgia; this difference could explain the relatively large number of Hispanic Americans in the construction industry.

Representation of African Americans in construction was lower compared to all industries in 2007-2009, a statistically significant difference. Educational requirements for construction jobs did not exceed the average educational attainment for African Americans in 2000, so other factors may be behind the relatively low number of African American workers in this industry. For example, a number of studies throughout the United States have argued that racial discrimination by construction unions has held down employment of African Americans in construction trades.[3] However, less than 10 percent of people working in construction in Georgia were union members or represented by unions in 2003-2005, so unions may not currently have as much effect as in more highly-unionized states.[4]

As one might expect given differences in education, representation of Asian-Pacific Americans in construction was lower than for the Georgia workforce as a whole. Asian-Pacific Americans made up less than 1 percent of the construction workforce but about 2 percent of all Georgia workers in 2007-2009. Subcontinent Asian Americans also represented a smaller portion of Georgia construction workers than workers in all Georgia industries in 2007-2009.

[3] See, for example, Waldinger, Roger and Thomas Bailey. 1991. "The Continuing Significance of Race: Racial Conflict and Racial Discrimination in Construction." *Politics & Society*, 19(3).

[4] CPWR - The Center for Construction Research and Training. *The Construction Chart Book, The U.S. Construction Industry and its Workers*. 2007. produced with support from the National Institute for Occupational Safety and Health grant number OH008307.

Figure D-2.
Demographics of workers in construction and all industries, 1980, 2000 and 2007-2009

Georgia	All industries			Construction					
	1980 (n=127,356)	2000 (n=200,033)	2007-09 (n=141,189)	1980 (n=8,180)		2000 (n=15,630)		2007-09 (n=10,290)	
Race/ethnicity									
African American	22.9 %	25.9 %	29.2 %	20.0 %	**	15.2 %	**	14.7 %	**
Asian-Pacific American	0.4	1.7	2.2	0.1	**	0.6	**	0.8	**
Subcontinent Asian American	0.1	0.7	1.0	0.1	**	0.1	**	0.1	**
Hispanic American	1.1	5.3	7.5	0.8	**	14.8	**	24.5	**
Native American	0.2	0.6	0.5	0.3		0.8		0.4	
Other minority group	0.1	0.2	0.3	0.0		0.3		0.4	**
Total minority	24.8 %	34.4 %	40.7 %	21.3 %		31.8 %		40.8 %	
Non-Hispanic white	75.2	65.6	59.3	78.7	**	68.2	**	59.1	
Total	100.0 %	100.0 %	100.0 %	100.0 %		100.0 %		100.0 %	
Gender									
Female	43.6	46.2	47.1	7.8 %	**	9.4 %	**	9.0 %	**
Male	56.4	53.8	52.9	92.2	**	90.6	**	91.0	**
Total	100.0 %	100.0 %	100.0 %	100.0 %		100.0 %		100.0 %	

United States	All industries			Construction					
	1980 (n=5,287,471)	2000 (n=6,832,970)	2007-09 (n=1,513,063)	1980 (n=330,464)		2000 (n=480,280)		2007-09 (n=106,823)	
Race/ethnicity									
African American	10.1 %	10.9 %	11.7 %	7.4 %	**	6.2 %	**	5.8 %	**
Asian-Pacific American	1.5	3.4	4.1	0.7	**	1.3	**	1.5	**
Subcontinent Asian American	0.2	0.7	1.0	0.1	**	0.2	**	0.2	**
Hispanic American	5.7	10.7	14.3	5.9	**	15.0	**	23.9	**
Native American	0.5	1.1	1.0	0.8	**	1.5	**	1.2	**
Other minority group	0.1	0.4	0.2	0.1		0.4		0.3	
Total minority	18.1 %	27.2 %	32.3 %	15.0 %		24.6 %		33.0 %	
Non-Hispanic white	81.9	72.7	67.7	85.1	**	75.5	**	67.0	**
Total	100.0 %	99.9 %	100.0 %	100.0 %		100.0 %		100.0 %	
Gender									
Female	42.2	46.5	46.7	7.9 %	**	9.9 %	**	9.2 %	**
Male	57.8	53.5	53.3	92.1	**	90.1	**	90.8	**
Total	100.0 %	100.0 %	100.0 %	100.0 %		100.0 %		100.0 %	

Note: ** Denotes that the difference in proportions between workers in the construction industry and workers in all industries for the given Census/ACS year is statistically significant at the 95% confidence level.

Source: BBC Research & Consulting from 1980 and 2000 U.S. Census 5% sample and 2007-2009 ACS Public Use Microdata Sample. The raw data extracts were obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Considering their representation in the entire Georgia labor force, relatively few women work in the Georgia construction industry. Women represented about 47 percent of the labor force in 2007-2009 but only 9 percent of construction workers during this period (see Figure D-2).

These patterns seen in the Georgia construction industry in 2000 and 2007-2009 were also evident in the United States during the same years.

Importance of unions in entering the construction industry. Labor scholars characterize construction as a historically volatile industry sensitive to business cycles, making the presence of labor unions important for stability and job security within the industry.[5] The temporary nature of construction work often results in uncertain job prospects, and the high turnover of laborers presents a disincentive for construction companies to invest in training. Some scholars claim that constant turnover has lent itself to informal recruitment practices and nepotism, compelling laborers to tap

[5] Applebaum, Herbert. 1999. *Construction Workers, U.S.A.* Westport: Greenwood Press.

social networks for training and work. They credit the importance of social networks with the high degree of ethnic segmentation in the construction industry.[6] This may have been particularly true for African Americans.[7]

Construction unions aim to provide a reliable source of labor for employers and to preserve job opportunities for workers by formalizing the recruitment process, coordinating training and apprenticeships, enforcing standards of work, and mitigating wage competition. The unionized sector of construction would seemingly be the best path for African American and other under-represented groups into the industry. However, there is evidence that the role of unions in the advancement of minorities and women in the construction industry has been both positive and negative. While recent studies provide evidence of unions playing a positive role in supporting and training minority and female workers, earlier research has shown how trade unions historically prevented minorities from obtaining employment in skilled trades.[8]

Several studies provide evidence of historical discrimination by trade unions. For example:

- A Department of Justice report in 1996 found that unions had used admissions criteria that adversely affected minorities. Federal courts ruled in the 1970s that standardized testing requirements unfairly disadvantaged minority applicants who had less exposure to testing, and that requirements that new union members have relatives in the union perpetuated the effects of past discrimination. The same report identified discriminatory practices in employee referral procedures that precluded minorities from having the same access to construction work as their white counterparts.[9]

- In 1999, a national study by Herbert Applebaum reported that, of those minority individuals who had been admitted to unions, a disproportionately low number were admitted into apprenticeship programs coordinated by unions. Apprenticeship programs are important means of producing skilled construction laborers, and the reported exclusion of African Americans from these programs may have severely limited their access to skilled occupations in the construction industry in the past.[10]

- According to testimony from African American union members reported in a 1994 study, even when unions implemented meritocratic mechanisms of apportioning employment to laborers, white workers were often allowed to circumvent procedures and received preference for construction jobs.[11]

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[6] Waldinger, Roger and Thomas Bailey. 1991. "The Continuing Significance of Race: Racial Conflict and Racial Discrimination in Construction." *Politics & Society*, 19(3).

[7] Feagin, Joe R. and Nikitah Imani. 1994. "Racial Barriers to African American Entrepreneurship: An Exploratory Study." *Social Problems*. 41(4): 562-584.

[8] U.S. Department of Justice. 1996. Proposed Reforms to Affirmative Action in Federal Procurement. 61 FR 26042.

[9] Ibid. See United States v. Iron Workers Local 86 (1971), Sims v. Sheet Metal Workers International Association (1973), and United States v. International Association of Bridge, Structural and Ornamental Iron Workers (1971).

[10] Applebaum, Herbert. 1999. *Construction Workers, U.S.A*. Westport: Greenwood Press.

[11] Feagin and Imani. 1994. "Racial Barriers to African American Entrepreneurship: An Exploratory Study." *Social Problems*. 41(4): 562-584.

More recent research, however, suggests that the relationship between minorities and unions has been changing. As a result, these historical observations may not be indicative of current dynamics in construction unions. Recent studies focusing on the role of unions in apprenticeship programs have compared minority and female participation and graduation rates for apprenticeships in joint programs (organized by unions and employers together) with rates in employer-only programs. Many of these studies conclude that the impact of union involvement is generally positive or neutral for minorities and women compared to non-Hispanic white males:

- In a 2005 study, Robert Glover and Cihan Bilginsoy analyzed apprenticeship programs in the U.S. construction industry during the period 1996-2003. Their dataset covered about 65 percent of apprenticeships during that time. The authors found that joint programs had "much higher enrolments and participation of women and ethnic/racial minorities" and exhibited "markedly better performance for all groups on rates of attrition and completion" compared to programs run only by employers.[12]

- In a similar analysis focusing on female apprentices, Bilginsoy and Berik found that women were most likely to become members of highly-skilled construction professions as a result of enrollment in joint programs, as opposed to employer-only programs. Moreover, the positive effect of union involvement in apprenticeship training was higher for African American women than for white women.[13]

- A recent study on the presence of African Americans and Hispanic Americans in apprenticeship programs found that African Americans were 8 percent more likely to be enrolled in a joint program than in an employer program. However, Hispanic Americans were less likely to be in a joint program than in an employer-only program.[14] These data suggest that Hispanic Americans may be more likely than African Americans to enter the construction industry without the support of a union.

Other data also indicate a more positive relationship between construction unions and minority workers than that which may have prevailed in the past. For example, 2007 Current Population Survey (CPS) data indicate that union membership rates for African Americans are similar to those of non-Hispanic whites.[15] The CPS asked participants "Are you a member of a labor union or of an employee association similar to a union?" CPS data show union membership for African Americans in construction to be 11 percent and non-Hispanic whites to be 12 percent — not a statistically significant difference. On the other hand, based on these national data, only 7 percent of Hispanic Americans are union members.

Even if the influence of unions on minority opportunities in construction is now positive, or at least neutral, any past barriers to entry and advancement may have lingering effects on the construction workforce and the pool of potential construction business owners.

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[12] Glover, Robert and Bilginsoy, Cihan. 2005. "Registered Apprenticeship Training in the U.S. Construction Industry." *Education & Training,* Vol. 47, 4/5, p 337.

[13] Günseli Berik, Cihan Bilginsoy. 2006. "Still a wedge in the door: women training for the construction trades in the USA", *International Journal of Manpower*, Vol. 27 Iss: 4, pp.321 - 341

[14] Bilginsoy, Cihan. 2005. "How Unions Affect Minority Representation in Building Trades Apprenticeship Programs." *Journal of Labor Research, 57(1).*

[15] 2006 Current Population Survey (CPS), U.S. Census Bureau and Bureau of Labor Statistics.

Advancement in the Georgia construction industry. To research opportunities for advancement in the construction industry, the study team examined the representation of minorities and women in different construction occupations, as defined by the U.S. Bureau of Labor Statistics.[16]

Race and ethnic composition of construction occupations. Figures D-3 and D-4 show the demographics of construction workers and those of particular construction occupations in 2000 and 2007-2009, respectively. The study team examined specific occupations to measure minority and female representation among workers in entry-level positions (e.g., construction laborers), specific skilled occupations (e.g., pipelayers and electricians) and higher-ranking occupations (e.g., first-line supervisors).

As a single group, minorities comprised about 41 percent of the Georgia construction workforce in 2007-2009, an increase from 2000 (32%). There were large differences in the demographic composition of workers in different construction occupations in 2007-2009. For example, about two-thirds of construction laborers in Georgia were minorities in 2007-2009, while just 22 percent of first-line supervisors were minorities.

Compared to the minority representation in the Georgia construction industry as a whole, a number of occupations had lower minority representation in 2007-2009:

- Electricians (24%);
- Pipelayers, plumbers, pipefitters and steamfitters (30%);
- Sheet metal workers (25%);
- Structural iron and steel workers (16%);
- Equipment operators (30%); and
- First-line supervisors (22%).

Minorities represented a larger proportion of workers in the following construction occupations:

- Construction laborers (67%);
- Brick masons, block masons and stonemasons (81%);
- Cement masons, concrete finishers and terrazzo works (74%);
- Fence erectors (61%); and
- Highway maintenance workers (56%).

Similar patterns are observed for Georgia construction occupations for 2000. Minorities comprised about 32 percent of the Georgia construction workforce but just 20 percent of first-line supervisor occupations. In contrast, about 56 percent of construction laborers in the Georgia construction industry were minority workers in 2000.

Most minorities working in the Georgia construction industry in 2007-2009 were Hispanic Americans. Representation of Hispanic Americans was substantially greater among construction laborers (50%) than among all construction workers (25%). In Georgia in 2007-2009, only 8 percent of first-line supervisors were Hispanic American.

[16] Bureau of Labor Statistics, U.S. Department of Labor. 2001. "Standard Occupational Classification Major Groups." http://www.bls.gov/soc/soc_majo.htm (accessed September, 2011).

Figure D-3.
Demographics of all construction workers and selected occupations in Georgia, 2000

Georgia	All construction occupations (n=15,630)	Construction laborers (n=2,193)	Brickmasons, blockmasons and stonemasons (n=394)	Cement masons, concrete finishers and terazzo workers (n=149)	Electricians (n=721)	Pipelayers, plumbers, pipefitters and steamfitters (n=586)	Sheet metal workers (n=116)	Structural iron and steel workers (n=74)	Fence erectors (n=58)	Equipment operators (n=664)	Highway maintenance workers (n=94)	First-line supervisors (n=1,491)
Race/ethnicity												
African American	15.2 %	22.4 %**	35.2 %**	46.2 %**	15.2 %	13.3 %	13.3 %	19.3 %	26.7 %	18.2 %	47.4 %**	10.9 %**
Hispanic American	14.8	31.7 **	27.3 **	24.2	4.9 **	6.0 **	7.7	12.5	11.1	4.1 **	10.2	6.7 **
Other minority group	1.8	1.4	1.1	0.0	1.1	1.1	0.0	0.0	0.0	0.2	0.0	2.3
Total minority	31.8 %	55.5 %	63.6 %	70.4 %	21.3 %	20.3 %	21.0 %	31.9	37.7 %	22.6 %	57.6 %	19.9 %
Non-Hispanic white	68.2	44.5 **	36.4 **	29.6 **	78.7 **	79.6 **	79.0	68.1	62.3	77.4 **	42.4 **	80.1 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0	100.0 %	100.0 %	100.0 %	100.0 %
Gender												
Female	9.4 %	4.0 %**	1.8 %**	1.7 %**	2.1 %**	2.3 %**	0.5 %**	0.0 %**	0.0 %**	2.5 %**	4.4 %	3.7 %**
Male	90.6	96.0 **	98.2 **	98.3 **	97.9 **	97.7 **	99.5 **	100.0 **	100.0 **	97.5 **	95.6	96.3 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0	100.0 %	100.0 %	100.0 %	100.0 %

Note: ** Denotes that the difference in proportions between all workers in the construction industry and those in specific occupations is statistically significant at the 95% confidence level.

Source: BBC Research & Consulting from 2000 U.S. Census 5% sample Public Use Microdata Sample. The raw data extracts were obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Figure D-4.
Demographics of all construction workers and selected occupations in Georgia, 2007-2009

Georgia	All construction occupations (n=10,290)	Construction laborers (n=1,583)	Brickmasons, blockmasons and stonemasons (n=179)	Cement masons, concrete finishers and terazzo workers (n=75)	Electricians (n=758)	Pipelayers, plumbers, pipefitters and steamfitters (n=355)	Sheet metal workers (n=50)	Structural iron and steel workers (n=43)	Fence erectors (n=22)	Equipment operators (n=372)	Highway maintenance workers (n=51)	First-line supervisors (n=988)
Race/ethnicity												
African American	14.7 %	15.7 %	31.7 % **	44.3 % **	13.8 %	17.0 %	7.0 %	3.5 % **	2.1 %	20.2 % **	46.1 % **	11.8 %
Hispanic American	24.5	49.6 **	47.9 **	29.3	8.8 **	9.8 **	18.2	11.7 **	58.8	9.3 **	9.9 **	8.3 **
Other minority group	1.7	1.5	1.3	0.0 **	1.2	3.2	0.0 **	0.7	0.0	0.2 **	0.3 **	1.8
Total minority	40.9 %	66.8 %	80.9 %	73.6 %	23.8 %	30.0 %	25.2 %	15.9	60.8 %	29.7 %	56.2 %	21.9 %
Non-Hispanic white	59.1	33.2 **	19.1 **	26.4 **	76.2 **	70.0 **	74.8 **	84.1 **	39.2	70.3 **	43.7	78.1 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0	100.0 %	100.0 %	100.0 %	100.0 %
Gender												
Female	9.0 %	2.6 % **	1.3 % **	0.0 % **	1.3 % **	0.8 % **	4.9 %	0.0 % **	12.3 %	2.4 % **	3.5 %	2.4 % **
Male	91.0	97.4 **	98.7 **	100.0 **	98.7 **	99.2 **	95.1	100.0 **	87.7	97.6	96.5	97.6 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0	100.0 %	100.0 %	100.0 %	100.0 %

Note: ** Denotes that the difference in proportions between all workers in the construction industry and those in specific occupations is statistically significant at the 95% confidence level.

Source: BBC Research & Consulting from 2007-2009 ACS Public Use Microdata Sample. The raw data extracts were obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

African Americans made up about 16 percent of the total construction workforce in 2007-2009 and 12 percent of first-line supervisors, but this difference was not statistically significant. (A larger difference in 2000 was statistically significant.)

Women in construction trades. Figure D-3 also compares the representation of women in the construction workforce with their representation in specific construction occupations. Overall, 9 percent of workers in the Georgia construction industry were women in 2007-2009.

Considering their representation in the full construction workforce, women comprised a small percentage of workers in most construction occupations. For example, women comprised only 3 percent of construction laborers and 2 percent of first-line supervisors in 2007-2009. Women working in the industry were highly concentrated in administrative or support roles: about 90 percent of office and administrative support occupations in the Georgia construction industry in 2007-2009 were women.[17]

Percentage of minorities and women in construction who are managers. To further assess advancement opportunities for minorities and women, the study team examined differences between demographic groups in the proportion of construction workers that were managers.

Figure D-5 presents the percentage of construction workers that reported being a construction manager in 2000 and 2007-2009.

Figure D-5. Percentage of construction workers who worked as a manager, 2000 and 2007-2009

Note:

** Denotes that the difference in proportions between the minority group and non-Hispanic whites (or between females and males) for the given Census/ACS year is statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from the 2000 U.S. Census 5% sample and 2007-2009 ACS Public Use Microdata samples. The raw data extracts were obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Georgia	2000		2007-09		Sample size 2000	Sample size 2007-09
Race/ethnicity						
African American	2.9 %	**	5.7 %	**	2,404	1,374
Asian American	4.0		12.5		79	89
Hispanic American	1.2	**	1.8	**	2,020	1,805
Native American	7.3		1.5	**	112	49
Non-Hispanic white	8.1		11.2		10,961	6,927
Gender						
Female	4.0 %	**	5.9 %	**	1,474	1,085
Male	6.5		8.3		14,156	9,205

United States	2000		2007-09		Sample size 2000	Sample size 2007-09
Race/ethnicity						
African American	3.1 %	**	4.8 %	**	26,736	5,044
Asian American	7.4		8.0	**	5,744	1,646
Hispanic American	2.5	**	3.0	**	66,495	19,455
Native American	4.6	**	5.4	**	7,633	1,546
Non-Hispanic white	7.5		10.0		371,025	78,678
Gender						
Female	4.1 %	**	5.8 %	**	46,778	10,794
Male	6.7		8.1		433,502	96,029

[17] Workers in "office and administrative support occupations" include those with an IPUMS occupation code (OCC) between 500 and 593. More information regarding occupations can be found on IPUMS website: http://usa.ipums.org/usa/.

In 2000, about 8 percent of non-Hispanic whites in the Georgia construction industry were managers. A smaller proportion of minorities than non-Hispanic whites were managers, ranging from 1 percent for Hispanic Americans to 7 percent for Native Americans.

In 2007-2009, the percentage of African Americans, Hispanic Americans and Native Americans who were construction managers in Georgia remained below that of non-Hispanic whites.

- About 6 percent of African Americans working in the construction industry were managers, compared to 11 percent of non-Hispanic whites (a statistically significant difference);
- About 2 percent of Hispanic Americans were managers (also a statistically significant difference compared to the rate for non-Hispanic whites); and
- Two percent of Native Americans were construction managers (a statistically significant difference).

For African Americans, Asian-Pacific Americans and Hispanic Americans, the proportion of construction workers who were managers increased between 2000 and 2007-2009. It appears that fewer Native Americans working in the construction industry were managers in the later years, although the sample size in 2007-2009 for Native Americans was small.

Construction managers working in Georgia had, on average, more education than workers in other construction occupations. For example, 11 percent of construction managers in 2007-2009 had at least a bachelor's degree compared to 4 percent of construction laborers. However, it does not appear that educational attainment can explain the racial/ethnic disparities in advancement to manager.

Female construction workers were also less likely than their male counterparts to be managers in 2000 and 2007-2009 (a statistically significant difference in both years). About 6 percent of women in the Georgia construction industry were managers compared to 8 percent of men in 2007-2009.

Engineering Industry

BBC next examined how education and employment may influence ownership opportunities for different race/ethnicity and gender groups in the engineering industry.[18]

Education. In contrast to the construction industry, lack of educational attainment may preclude workers' entry into the engineering industry, as many occupations require at least a four-year college degree. Based on Census data for 2007-2009, 62 percent of individuals working in the Georgia engineering industry had at least a four-year college degree. Barriers to such education, therefore, can restrict employment opportunities, advancement and ultimately business ownership. Low numbers of minority- and women-owned engineering business may, in part, be due to differences in education across race, ethnicity and gender groups.[19]

[18] As discussed on the first page of this appendix, "engineering industry" refers to the federally-defined architectural, engineering and related services sector.

[19] Feagin, Joe R. and Nikitah Imani. 1994. "Racial Barriers to African American Entrepreneurship: An Exploratory Study." *Social Problems*. 42 (4): 562-584.

Based on 2000 Census data and 2007-2009 ACS data, Figure D-6 presents the percentage of workers, age 25 and older, with at least a four-year degree in Georgia and the United States. A smaller share of African Americans, Hispanic Americans and Native Americans had a bachelor's degree than non-Hispanic whites in Georgia.

Compared with 37 percent of all non-Hispanic white workers age 25 and older who had at least a four-year degree in 2007-2009:

- About 24 percent of African Americans had at least a four-year college degree;
- 15 percent of Hispanic Americans were college graduates; and
- 27 percent of Native Americans had reached this level of educational attainment.

Some groups in Georgia were more likely than non-Hispanic whites to be college graduates in 2007-2009. About 45 percent of Asian-Pacific Americans and 76 percent of Subcontinent Asian Americans had at least a bachelor's degree. In 2007-2009, a larger percentage of women (33%) had a bachelor's degree than men (31%), a statistically significant difference.

Figure D-6. Percentage of labor force 25 and older with at least a four-year degree, 2000 and 2007-2009

Note:

** Denotes that the difference in proportions between the minority and non-Hispanic white groups (or female and male gender groups) for the given Census/ACS year is statistically significant at the 95% confidence level.

Source:

BBC Research & Consulting from 2000 U.S. Census 5% sample and 2007-2009 ACS Public Use Microdata Sample. The raw data extracts were obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Georgia	2000	2007-09	Sample size 2000	Sample size 2007-09
Race/ethnicity				
African American	20.3 % **	23.8 % **	41,575	30,689
Asian-Pacific American	39.8 **	45.2 **	2,569	2,898
Subcontinent Asian American	68.6 **	76.0 **	968	1,404
Hispanic American	15.9 **	14.6 **	6,557	6,872
Native American	22.0 **	26.7 **	951	590
Other minority group	36.7	32.5	330	246
Non-Hispanic white	33.0	36.9	114,715	80,543
Gender				
Female	28.9 %	33.0 % **	78,455	59,605
Male	29.8	31.3	89,210	63,637
United States	**2000**	**2007-09**	**Sample size 2000**	**Sample size 2007-09**
Race/ethnicity				
African American	19.1 % **	22.2 % **	552,222	118,247
Asian-Pacific American	44.9 **	48.6 **	186,301	53,173
Subcontinent Asian American	68.4 **	73.8 **	37,266	13,250
Hispanic American	13.4 **	14.9 **	533,233	145,484
Native American	17.1 **	19.7 **	67,317	14,391
Other minority group	30.0 **	33.8 **	22,378	2,532
Non-Hispanic white	32.5	36.2	4,368,674	964,403
Gender				
Female	29.3 % **	33.4 % **	2,680,051	624,267
Male	30.2	31.7	3,087,340	687,213

Employment. Figure D-7 compares the demographic composition of the Georgia engineering industry workforce (with and without a college degree) to that of all workers age 25 and older with a college degree. In 2007-2009, minorities comprised 22 percent of workers in the Georgia engineering industry, an increase from 2000 (19%).

Of those working in the Georgia engineering industry in 2007-2009:

- 15 percent were African Americans;
- 2 percent were Asian-Pacific Americans;
- 2 percent were Subcontinent Asian American;
- 3 percent were Hispanic Americans; and
- Less than 1 percent were Native Americans.

In 2007-2009, 15 percent of workers in engineering industry were African American compared with 21 percent of all workers with a four-year college degree (a statistically significant difference). The representation of Asian-Pacific Americans and Subcontinent Asian Americans in the Georgia engineering industry was also lower than what might be expected given educational attainment. Women represented 49 percent of workers with a college degree in 2007-2009 but just 30 percent of engineering industry workers, a statistically significant difference. (Due to limited sample size, the study team did not examine specific occupations in the industry.)

Figure D-7.
Demographic distribution of engineering industry workers and workers age 25 and older with a four-year college degree in all industries, 1980, 2000 and 2007-2009

Georgia	Workers 25+ with college degree			Engineering industry workforce		
	1980 (n=18,225)	2000 (n=46,103)	2007-09 (n=42,851)	1980 (n=575)	2000 (n=1,509)	2007-09 (n=1,467)
Race/ethnicity						
African American	12.1 %	17.4 %	21.2 %	5.4 % **	11.7 % **	15.0 % **
Asian-Pacific American	0.6	2.4	3.2	1.0	2.6	2.1 **
Subcontinent Asian American	0.4	1.6	2.5	0.5	1.0	1.5 **
Hispanic American	0.9	2.4	3.3	1.0	2.2	3.1
Native American	0.1	0.4	0.4	0.2	0.6	0.5
Other minority group	0.1	0.3	0.3	0.2	0.6	0.1 **
Total minority	14.2 %	24.4 %	30.8 %	8.3 %	18.7 %	22.3 %
Non-Hispanic white	85.8	75.6	69.2	91.7 **	81.3 **	77.7 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
Gender						
Female	36.6 %	45.5 %	48.5 %	20.9 % **	25.9 % **	29.5 % **
Male	63.4	54.5	51.5	79.1 **	74.1 **	70.5 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

United States	Workers 25+ with college degree			Engineering industry workforce		
	1980 (n=858,511)	2000 (n=1,631,919)	2007-09 (n=445,915)	1980 (n=28,869)	2000 (n=58,221)	2007-09 (n=16,737)
Race/ethnicity						
African American	5.3 %	6.8 %	7.8 %	3.1 % **	4.2 % **	5.0 % **
Asian-Pacific American	2.7	5.2	6.2	2.8	4.6 **	5.1 **
Subcontinent Asian American	0.6	1.7	2.5	1.1 **	1.3 **	1.5 **
Hispanic American	2.5	4.4	6.2	3.5 **	5.5 **	6.8 **
Native American	0.2	0.6	0.6	0.3 **	0.7	0.6
Other minority group	0.1	0.4	0.2	0.1	0.4	0.2
Total minority	11.4 %	19.1 %	23.5 %	11.1 %	16.7 %	19.2 %
Non-Hispanic white	88.6	80.9	76.4	88.9	83.3 **	80.8 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
Gender						
Female	34.7 %	45.6 %	47.9 %	21.1 % **	26.0 % **	26.8 % **
Male	65.3	54.4	52.1	78.9 **	74.0 **	73.2 **
Total	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

Note: ** Denotes that the difference in proportions between engineering industry workers and workers age 25 or older with a four-year degree in all industry groups for the given Census/ACS year is statistically significant at the 95% confidence level.

Source: BBC Research & Consulting from 1980 and 2000 U.S. Census 5% sample and 2007-2009 ACS Public Use Microdata Sample. The raw data extracts were obtained through the IPUMS program of the MN Population Center: http://usa.ipums.org/usa/.

Summary of Entry and Advancement in the Construction and Engineering-Related Industries

BBC's analysis suggests that barriers to entry in the construction and engineering industries in Georgia may help explain the relatively low number of businesses owned by certain minority groups and women.

- In 2000 and 2007-2009, relatively fewer African Americans worked in the Georgia construction industry compared to all industries.

- In 2000 and 2007-2009, women were represented in the Georgia construction industry in particularly low numbers considering their representation among all workers.

- Lack of education appears to be a barrier to entry into the Georgia engineering industry for African Americans, Hispanic Americans and Native Americans. In 2000 and 2007-2009, workers in each of these groups were less likely to have a bachelor's degree compared to non-Hispanic whites. After controlling for a college education, however, a smaller number of African Americans, Asian-Pacific Americans and Subcontinent Asian Americans were working in the Georgia engineering industry compared with representation of these groups among people with a college degree.

- In 2000 and 2007-2009, only about one-in-four workers in the Georgia engineering industry were women, despite the fact that women comprised nearly one-half of the population with a college degree.

Barriers to advancement in the construction industry may also be an important reason for the relatively low number of minority and female business owners. In 2000 and 2007-2009:

- There were large differences in the representation of African Americans among construction occupations, suggesting barriers to entry or advancement into certain construction fields. This was also true for Hispanics and for women (often in the same occupations).

- There is some evidence of barriers to advancement based on the relative number of minorities and women working in the industry who were first line supervisors and managers.